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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/758,963	01/10/2001	Junji Yoshida	07742-06 (6635-60093)	9664

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COUDERT BROTHERS
600 Beach Street
San Francisco, CA 94109

EXAMINER

NGUYEN, TUAN M

ART UNIT PAPER NUMBER

2828

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/758,963

Applicant(s)

YOSHIDA ET AL.

Examiner

Tuan M Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

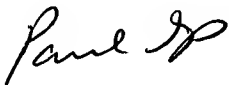
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-72 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings (fig. 1) is objected for minor informalities. The n-InP electrode (1) show in figure 1 is not labeled correctly, it should be n-InP substrate (1) per specification col. 15 line 14. Applicant is required to submit a drawing correction for approval as require by rule 37 CFR 1.123.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-72 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding to claim 1, the claim recites a semiconductor laser apparatus with respective element value on the basic of relationship between respective elements including a cavity length , a carrier concentration of an upper cladding layer a photodiode conversion efficiency of electric drive power of the semiconductor laser for the optical output power to be constant as a parameter. The claim recites a plurality of elements which the recited elements are not structural related or connected to conform the laser apparatus. Claim 1-72 are apparent literal translation from the foreign application. The claim fails to provide a clear structure to support the claim which render the claim confusing , vague and indefinite.

Regarding to claims 2, 9 and 17, the claim recites **a range** of optical output power over 50 mW and for cavity length to be constant as a parameter in **a range** over 1000 μm , so that the electric drive power is vicinal to a minimum/maximum thereof on correspondence to a desired optical power. It is unclear the limit of the ranges which render the claims confusing, vague and indefinite.

Regarding to claim 25, the claim recites a semiconductor laser apparatus, an upper cladding layer has an impurity carrier concentration determined on the **basis of a relationship** of a photoelectric conversion efficiency of electric drive power to the impurity carrier concentration of the upper cladding layer. It is unclear the **basis of a relationship** meant. The claim fails to provide a clear structure which render the claim confusing, vague and indefinite.

Regarding to claims 29, 30, 36 and 39, the claim recite acquiring relationship between respective elements of the semiconductor laser apparatus including a cavity length, a carrier concentration of an upper cladding layer, a photoelectric conversion efficiency or electric drive power of the semiconductor laser. The claims fail to provide a clear structure to support the claims. The claims also recite determining a respective element value of the semiconductor laser apparatus to determined on the **basis of a relationship** acquired by the relationship acquiring step. It is unclear the **basis of a relationship** meant which render the claims confusing, vague and indefinite.

Regarding to claims 34 and 37, the claim recites determining **an approximation expression** for making the photoelectric conversion efficiency maximal in correspondence to the desirable optical output power on the **basis of a relationship** acquired by the relationship

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acquiring step, it is unclear **an approximation expression** meant which render the claim confusing, vague and indefinite.

Regarding to claims 41 and 49, the claims recite a semiconductor laser comprising a resonator cavity, an active layer, a low/high reflectance coating, a power supply, the claim fails to provide a clear structure to support the claims which render the claim confusing, vague and indefinite.

Regarding to claims 57, the functional recitation that “a method of operating a semiconductor laser comprising operating the semiconductor laser at an optical output power level P_{out} which is less than or equal to a specified upper bound and which is greater than or equal to a specified lower bound based on the cavity length, the specified upper and lower bounds being based on the cavity length” has not given patentable weight because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a “means” for performing the specified function, as set forth 35 U.S.C. 112 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. In re Fuller, 1929 C.D. 172; 388 O.G. 279.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-5, 9-13, 17-21, 25, 29-40 are rejected under 35 U.S.C. 102(a) as being anticipated by Jeon et al (6,174,748).

With respect to claims 1, 25, 29, Jeon discloses a semiconductor laser device comprising a substrate, a first cladding layer, a waveguide layer consists of an active waveguide layer that includes multiple quantum wells, a second cladding layer, the electrical – to – optical efficiency conversion, note col. 3 line 23 to col. 11 line 40.

With respect to claims 2 and 17, Jeon discloses method of forming a tapered section in a semiconductor device to provide for reproducible mode profile of the output beam comprising a semiconductor device (10) has a length of 1000 μm and the optical output over 50 mw, note col. 6 line 25 to col. 13 line 32, see figs. 1 and 10a.

With respect to claims 3, 11, 19, 30, Jeon discloses an active layer forming a cavity with the cavity length has a strain multiple quantum well structure, note col. 3.

With respect to claims 4-5, 12-13 and 20-21, Jeon discloses the wavelength within a range 1000 – 1600 μm and optical output is within a range 50 – 400 mw and the wavelength within a range 1000- 1400 μm and the optical output is within a range 50 –200 mw, note col. 6 line 25 to col. 13 line 32 see figs. 1 and 10a.

With respect to claim 9, Jeon discloses a cavity length of 1000 μm and the optical output over 50 mw, note col. 6 line 25 to col. 13 line 32, see figs. 1 and 10a.

With respect to claims 10 and 18, Jeon discloses the cavity length is determined on the basic of an approximation expression making the photoelectric conversion efficiency maximal on correspondence to the desirable optical power, note col. 11.

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With respect to claims 31, 33, 36, 39, Jeon discloses the optical output over 50 mw and the cavity range over 1000 μm and the electrical-to-optical conversion efficiency, note col. 6 line 25 to col. 13 line 67.

With respect to claim 32, Jeon discloses an active layer forming a cavity with the cavity length has a strain multiple quantum well structure, note col. 3.

With respect to claims 34, 37, Jeon discloses the electrical-to-optical conversion efficiency maximal in correspondence to the desirable optical output, note col. 11.

With respect to claims 35, 38, 40, Jeon discloses an active layer forming a cavity with the cavity length has a strain multiple quantum well structure, note col. 3.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 6-8, 14-16, 22-24 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon et al (6,174,748) in view of Hamakawa et al (5,993,073).

With respect to claims 6, 14, 22, 26, Jeon discloses all limitations as set forth in claim 2 except for a semiconductor laser module comprising an optical fiber and optical coupling lens system. Whereas Hamakawa et al discloses a semiconductor laser module (1), an optical fiber (21) and an optical coupling lens system (14, 23) see fig. 1. For the benefit of optical coupling between the semiconductor laser module and the optical fiber, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jeon with the semiconductor laser module includes an optical fiber and an optical coupling lens system as taught or suggested by Hamakawa et al.

With respect to claims 7-8, 15-16, 23-24 and 27-28, Hamakawa et al discloses a cooling means (13) as a temperature controller and an optical fiber grating (FG1, FG2) and a hermetic glass (15) is consider as a n isolator, note col. 3 line 60 to col. 4 line 15, see fig. 1.

9. Claims 41-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon et al (6,174,748) in view of Itoh et al (6,249,534) further in view of Mugino et al (6,343,088).

With respect to claims 41, 49 and 57, Jeon discloses a resonator cavity having a front/back facets and a length L in the range of approximately 900 μm to approximately 1800 μm and an active region includes plurality of quantum wells, note col. 6 line 25 to col. 7 line 10. However Jeon does not discloses the electrodes and reflectance coating. Whereas Itoh et al discloses the electrodes (11, 16), MQW active layer (14), the facets (20a, 20b), note col. 4 and Mugino et al discloses the high reflectance multiplayer coating having a reflectance of 98% and

low reflectance multiplayer coating having a reflectance of 1 %, note col. 9, see fig.1. For the benefit of protective the light emitted from the laser diode, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jeon with the reflectance index as taught or suggested by Mugino.

With respect to claims 42 , 50 and 58, Jeon discloses the cavity length approximately 1000 μm and the optical output approximately 50 mW, note col. 6 line 25 to col. 13 line 31.

With respect to claims 43-48, 51-56 and 59-64, Jeon discloses the cavity length approximately 1000 μm and the optical output approximately 80 mW, note col. 6 line 25 to col. 13 line 31, except for the optical output power range between 100 mW to 360 mW. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the optical output power ranges between 100 mW to 360 mW, since it has been held that discovering an optimum or working range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With respect to claims 65-72, Jeon discloses the cavity length of semiconductor laser to provide reduced power consumption or increase photoelectric conversion efficiency for a selected output power 80 mW , the semiconductor laser including a resonator cavity having a front/back facets, an active region includes plurality of quantum wells, and the cavity length of 1000 μm , note col. 6 line 25 to col. 7 line 10. However Jeon does not discloses the MQW active layer , the high /low reflectance coating and the length approximately within the ranges 1000 to 1750 μm and the optical output power in the range from 50 mW to 390 mW . Whereas Itoh et al discloses the electrodes (11, 16), MQW active layer (14), the facets (20a, 20b), note col. 4 and

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Mugino et al discloses the high reflectance multiplayer coating having a reflectance of 98% and low reflectance multiplayer coating having a reflectance of 1 %, note col. 9, see fig.1. For the benefit of protective the light emitted from the laser diode, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jeon with the reflectance index as taught or suggested by Mugino. Since it has been held that discovering an optimum or working range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Citation Of The Pertinent References

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclose.

The patent to Fukunaga (US patent 6,456,638) discloses high power short wavelength semiconductor light emitting device having active layer with increased indium content.

The patent to Sato(US patent 6,232,264) discloses optical semiconductor device having an active layer containing N.

The patent to Hatakoshi et al (US patent 5,036,521) discloses semiconductor laser device.

Communication Information

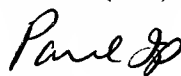
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan M Nguyen whose telephone number is (703) 306-0247.

The examiner can normally be reached on 8am to 5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-5511 for regular communications and (703) 306-5511 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3329.



Paul Ip
SPE
Art unit 2828

TMN
October 29, 2002